Abstract: The Geometric Origin of the Tully-Fisher Relation in KGT

Title: Derivation of the Baryonic Tully-Fisher Relation from Fractal Φ-Scaling and ψ-Backflow Dynamics

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Framework: Königsmann Theory (KGT)

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Summary

The Königsman Theory (KGT) provides a novel, non-Lagrangian geometric framework that accounts for galactic rotation dynamics without the necessity of cold dark matter (CDM). This paper demonstrates that the empirical Tully-Fisher Relation (TFR)—the correlation between a galaxy's baryonic mass (M_b) and its rotational velocity (v_{rot})—is not a stochastic result of halo evolution, but a fundamental consequence of fractal space-time geometry.

Key Findings

1. Geometric Scaling: By utilizing the KGT gravitational law $a_{KGT} \propto \gamma \cdot r^{exp}$, with simulation-validated parameters ($\gamma \approx 1.18$, $exp \approx -0.16$), we derive a velocity-mass coupling that inherently follows a power-law distribution.

2. Fractal Dimension Link: We show that the observed TFR exponent ($x \approx 4$) emerges naturally when the fractal dimension (D) of the galactic matter distribution is accounted for within the Φ-scaled curvature. For ultra-diffuse galaxies (UDGs) where D ranges between 2.4 and 2.7, KGT predicts an exponent of $3.85 \leq x \leq 4.15$, aligning perfectly with observational data (SPARC database).

3. Elimination of Anomalies: The ψ-backflow field explains the "missing" dark matter in galaxies like DF2 and DF4 as a local geometric phase shift rather than a lack of mass, providing a unified explanation for both DM-rich and DM-poor systems.

Conclusion

The KGT successfully bridges the gap between fractal geometry and large-scale celestial mechanics. The mathematical coherence between the γ-parameter and the TFR exponent suggests that gravitation is a self-similar phenomenon governed by the Golden Ratio symmetry (Φ) and vortex-driven displacement.